Litton BIONETICS

MUTAGENIC EVALUATION OF
COMPOUND FDA 73-83

977051390

MUSTARD, YELLOW

Y20

7315 Wisconsin Avenue
Bethesda, Maryland
20014

Mutagenic Evaluation of Compound FDA 73-83 **Mustard, Yellow** 5/30/75

LBI PROJECT #2468

MUTAGENIC EVALUATION OF COMPOUND FDA 73-83

977051390

MUSTARD, YELLOW

SUBMITTED TO

FOOD AND DRUG ADMINISTRATION
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
ROCKVILLE, MARYLAND

SUBMITTED BY

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KENSINGTON, MARYLAND

MAY 30, 1975

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DATE: May 30, 1975

SPONSOR: Food and Drug Administration, Contract Number 223-74-2104

SUBJECT: Evaluation of Test Compound 977051390, Mustard, Yellow FDA 73-83

I. OBJECTIVE

The objective of this study was to evaluate the test compound for genetic activity in microbial assays with and without the addition of mammalian metabolic activation preparations.

II. MATERIALS

A. Test Compound

1. Date Received: August, 1974

2. Description: yellow powder

B. Indicator Microorganisms

The following strains of indicator microorganisms were used in the evaluation:

Yeast Strain: Saccharomyces cerevisiae, strain D4

Bacteria Strains: Salmonella typhimurium, strains: TA-1535
TA-1537
TA-1538

C. Reaction Mixture

The following reaction mixture was employed in the activation tests:

Component	Final Concentration/ml
1. TPN (sodium salt)	6.0 µM
2. Isocitric acid	49.0 µM
3. Tris buffer, pH 7.4	28.0 µM
4. $MgCl_2$	1.7 µM
5. Tissue homogenate fraction	72.0 mg

D. Tissue Homogenates and Supernatants

The tissue homogenates and 9,000 x g supernatants were prepared from tissues of the following mammalian species: Mouse-ICR random bred adult males; rat-Sprague-Dawley adult males; and primate-Macaca mulatta adult males.

E. Positive Control Compounds

Table 1 lists chemicals for positive controls in the direct and activation assays.

TABLE 1

POSITIVE CONTROLS USED IN DIRECT AND ACTIVATION ASSAYS

Assay	Chemical[a]	Solvent	Probable Mutagenic Specificity
Nonactivation	Ethyl methanesulfonate	Water or saline	BPS[b]
	2-Nitrofluorene	Dimethylsulfoxide[c]	FS[b]
	Quinacrine mustard	Water or saline	FS[b]
Activation	Dimethylnitrosamine	Water or saline	BPS[b]
	2-Acetylaminofluorene	Dimethylsulfoxide[c]	FS[b]

[a] Concentrations given in the Results Section
[b] BPS = base-pair substitution; FS = frameshift
[c] Previously shown to be non-mutagenic

III. METHODS

A. Toxicity

The solubility, toxicity and doses for all chemicals were determined prior to screening.

Each chemical was tested for survival against the specific indicator strains over a range of doses to determine the 50% survival dose. Bacteria were tested in phosphate buffer, pH 7.4, for one hour at 37°C on a shaker. Yeasts were tested in phosphate buffer, pH 7.4, for four hours at 30°C on a shaker. The 50% survival curve and the 1/4 and 1/2 50% doses calculated.

If no toxicity was obtained for a chemical with a given strain, then a maximum dose of 5% (w/v) was used against the strain.

Unless otherwise specified, the doses calculated for the tests in buffer were applied to the activation tests. The solubility of the test chemical under treatment conditions is stated in the Results Section.

B. Plate Tests

In the nonactivation procedure, approximately 10^9 cells of a log-phase culture of the bacterial indicator strains were spread over the surface of a minimal plate, and a measured amount of the test chemical was placed in the center of the test plate. In activation tests, the test chemical was added to the cells, and an aliquot of the mixture was spread on the surface of the test plate. The reaction mixture (0.1 ml) plus tissue extract was then spotted on the surface of the plate. Positive and solvent controls were included. All plates were incubated at 37°C for four days and then scored. Each compound (test, positive control and solvent control) was done in duplicate. Concentrations of the positive control compounds are listed in the Results Section.

C. Suspension Tests

1. Nonactivation

Log-phase bacteria and stationary-phase yeast cultures of the indicator organisms were grown in complete broth, washed and resuspended in 0.9% saline to densities of 1×10^9 cells/ml and 5×10^7 cells/ml, respectively. This constituted the working stock for tests of a group of test chemicals and their respective controls. Tests were conducted in plastic tissue culture plates. Cells plus appropriate volume(s) of the test chemical were added to the wells to give a final volume of 1.5 ml. The solvent replaced the test chemical in the negative controls. Treatment was at 30°C for four hours for yeast tests and at 37°C for one hour for bacterial tests. All flasks were shaken during treatment. Following treatment, the plates were set on ice. Aliquots of cells were removed, diluted in sterile saline (4°C) and plated on the appropriate complete media. Undiluted samples from flasks containing the bacteria were plated on minimal selective medium in reversion experiments. Samples from a 10^{-1} dilution of treated cells were plated on the selected media for enumeration of gene conversion with strain D4. Bacterial plates were scored after incubation for 48 hours at 37°C. The yeast plates were incubated at 30°C for 3-5 days before scoring.

2. Activation

Bacteria and yeast cells were grown and prepared as described in the nonactivation tests. Measured amounts of the test and control chemicals plus 0.25 ml of the stock-cell suspension were added to wells of the Linbro plate containing the appropriate tissue fraction and reaction mixture. All flasks (bacteria and yeast) were incubated at 37°C in an oxygen atmosphere with shaking. The treatment times as well as the dilutions, plating procedures and scoring of the plates were the same as described for nonactivation tests.

D. Preparation of Tissue Homogenates and 9,000 x g Cell Fractions

Male animals (sufficient to provide the necessary quantities of tissues) were killed by cranial blow, decapitated and bled. Organs were immediately dissected from the animal using aseptic techniques and placed in ice-cold 0.25 M sucrose buffered with Tris at pH of 7.4. Upon collection of the desired quantity of organs, they were washed twice with fresh buffered sucrose and completely homogenized with a motor-driven homogenizing unit at 4°C. The whole organ homogenate obtained from this step was divided into two samples. One sample was frozen at -80°C and the other was centrifuged for 20 minutes at 9,000 x g in a refrigerated centrifuge. The supernatant from the centrifuged sample was retained and frozen at -80°C. These two frozen samples were used for the activation studies.

E. Data Recording and Reporting

Following the specified incubation periods all population plates were scored by an automatic colony counter and the results from each plate of a set were recorded, in ink, on data processing forms. All minimal or other types of selective media plates were hand scored and the results recorded along with the respective population data. Other relevant experimental data were recorded on experimental definition forms. For bacteria strains the number of colonies recorded from either the population or selective plates represents that number in 1 ml of test suspension plated. The numbers recorded for the yeast strain D4 represent the number in 0.5 ml of test suspension plated. The data were then processed and printed from a computer program.

IV. RESULTS SECTION

A. Solubility Properties of the Test Compound

1. Name or code designation of the test compound: 977051390, Mustard Yellow

2. Test solvent: DMSO

3. Solubility of the test compound under treatment conditions: Chemical soluble at treatment concentrations.

4. Additional comments: yellow powder

B. Toxicity and Dosage Determinations for the Test Compound

1. Test date for toxicity determination: February 11, 1975

2. The 50% survival level was determined for bacteria and yeast indicator organisms by conducting survival curves with the test compound at the following concentrations:

Percent Concentration (w/v or v/v)

5.0
0.5
0.05
0.005
0.0005

3. Concentrations of the test compound used in the mutagenicity tests:

Dose	Percent Concentration	
	Bacteria	Yeast
1/4 50% Survival	0.25	0.0025
1/2 50% Survival	0.50	0.0050
50% Survival	1.00	0.0100
Plate Tests	0.50	--

V. SUMMARY OF TEST RESULTS

Plate Tests

A. Name or code designation of the test compound: 977051390

B. Test date: March 29, 1975

C. Concentration of the test compound: 0.5%

Test	Species	Tissue	TA-1535		TA-1537		TA-1538	
			1	2	1	2	1	2
1. Nonactivation								
Solvent Control	---	---	11	20	4	5	15	11
Positive Control[a]	---	---	>10^5	>10^5	193	207	145	134
Test Compound	---	---	6	13	8	8	17	16
2. Activation								
Negative Control	---	---	7	10	6	3	7	12
Solvent Control	---	---	20	24	5	9	15	14
Reaction Mixture Control	---	---	23	20	7	8	18	16
Positive Control[b]	Mouse	Liver	>10^3	>10^3	39	34	343	357
Positive Control		Lung	12	8	2	1	11	16
Positive Control		Testes	16	17	3	8	7	11
Positive Control	Rat	Liver	>10^3	>10^3	89	88	347	341
Positive Control		Lung	14	7	2	3	14	18
Positive Control		Testes	16	13	5	7	10	12
Positive Control	Monkey	Liver	273	356	30	33	123	119
Positive Control		Lung	8	8	2	2	13	14
Positive Control		Testes	15	12	3	6	8	11
Test Compound	Mouse	Liver	10	8	2	4	9	17
Test Compound		Lung	3	10	0	1	14	9
Test Compound		Testes	8	7	2	1	41	17
Test Compound	Rat	Liver	11	8	3	3	10	15
Test Compound		Lung	4	10	1	2	15	7
Test Compound		Testes	10	8	4	1	13	17
Test Compound	Monkey	Liver	9	7	2	4	13	16
Test Compound		Lung	3	10	0	2	16	8
Test Compound		Testes	5	4	3	3	8	15

a TA-1535 EMS 10 µl/plate
TA-1537 QM 20 µg/plate
TA-1538 NF 100 µg/plate

b TA-1535 DMNA 50 µM/plate
TA-1537 AAF 100 µg/plate
TA-1538 AAF 100 µg/plate

DATA TABLE TERMS AND ABBREVIATIONS

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
COMPOUND	Client designated compound number appears in this column.
TEST CODES	NAN = Nonactivation: Solvent Control NAP = Nonactivation: Positive Control NA1 = Nonactivation: Test Compound Dose 1 NA2, etc. = Reflects the other dose level(s) A+C = Negative Chemical Control A-C = Activation: Solvent Control ACP = Activation: Positive Control ACT = Activation: Test Compound A+T = Activation: Tissue Control LI = Liver Tissue Activation Fraction LU = Lung Tissue Activation Fraction KI = Kidney Tissue Activation Fraction TE = Testes Tissue Activation Fraction 1,2, etc. = Dose Levels
CONCENTRATION	All test compound dose levels are expressed as a whole number followed by an exponent (negative) identified by the appropriate units. Example: 0025-2PCT = 0.25 percent concentration
POPU	Total number of viable cells in the plating sample raised to some exponent printed directly below the abbreviation (i.e., EP + 6 = x 10^6).
MUT 1	Total number of mutants or convertants obtained from the sample plated raised to some exponent printed directly below the abbreviation (i.e., EP + 0 = x 10^0). For strain D4, MUT 1 represents the number of ADE+ convertants.
MUT 2	Only used for strain D4 and represents the number of TRY+ convertants in the plated sample.
FREQ 1	The calculated mutation or gene conversion frequency times the negative exponent written directly below. For strain D4, FREQ 1 represents the ADE+ value.
FREQ 2	Only used for strain D4 and represents the TRY+ conversion frequency.
CONTAM	Presence of contamination on any plates.

cDATA TABLE TERMS AND ABBREVIATIONS (continued)

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
AAF	2-Acetylaminofluorene
DMSO	Dimethylsulfoxide
DMN	Dimethylnitrosamine
EMS	Ethyl Methanesulfonate
QM	Quinacrine Mustard
NF	Nitrofluorene
SPECIES	Animal Strains
SPRDAW	Sprague Dawley Rats
ICRFLO	Flow ICR Random Bred Mice
RHESUS	Rhesus Monkey (Macaca mulatta)
MIXEDB	Dog, Mixed Breed
NEWZEA	New Zealand White Rabbit

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 05/15/75

SPECIES COMPOUND 977051390

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
NAN		10.15	2.10	9.02	1.58	1.69
NAP		273.70	225.89	145.97	113.25	60.11
NA1		17.37	2.87	15.72	1.00	5.26
NA2		14.99	2.04	11.66	1.32	3.07

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REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 05/15/75

SPECIES ICRFLO COMPOUND 977051390

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	5.99	2.10	11.20	16.01	4.11
ACT	A+T	12.45	2.10	10.46	15.24	3.26
ACT	A-C	6.65	2.91	10.54	19.85	3.33
ACT	PLI	1168.86	10.07	37.43	20.62	4.92
ACT	PLU	8.06	2.19	12.57	39.08	3.22
ACT	PTE	9.32	2.86	12.54	23.53	3.29
ACT	LI1	4.95	2.75	27.16	17.96	2.25
ACT	LI2	7.18	2.26	25.07	19.01	3.09
ACT	LU1	6.52	2.22	22.13	16.37	1.79
ACT	LU2	8.86	2.29	19.48	20.21	1.38
ACT	TE1	6.07	4.24	29.11	13.80	2.51
ACT	TE2	9.20	2.03	21.79	15.50	2.88

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 06/24/75

SPECIES SPRDAW/RAT COMPOUND 977051390

TEST	ORG	TA1538 HIS EX-8	TA1535 HIS EX-8	TA1537 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	5.39	17.47	0.63	0.58	0.39
ACT	A+T	10.55	11.03	1.23	2.35	2.75
ACT	A-C	5.36	11.62	0.58	0.72	0.18
ACT	PLI	59.37	1500.00	7.28	8.75	10.22
ACT	PLU	7.31	18.29	0.84	3.40	1.39
ACT	PTE	8.13	22.47	0.33	3.38	1.93
ACT	LI1	6.74	11.87	0.50	1.47	3.19
ACT	LI2	10.92	11.02	0.59	2.81	5.88
ACT	LU1	5.75	14.66	0.48	1.88	2.26
ACT	LU2	5.44	12.32	0.64	1.13	1.25
ACT	TE1	7.36	15.92	0.62	2.48	0.78
ACT	TE2	6.70	13.88	0.82	2.39	1.74

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 05/15/75

SPECIES RHESUS COMPOUND 977051390

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	7.43	7.44	4.49	10.40	1.65
ACT	A+T	14.05	11.84	4.09	15.69	2.55
ACT	A-C	7.01	7.04	5.55	14.76	2.24
ACT	PLI	1352.79	19.31	24.13	14.99	2.71
ACT	PLU	4.62	6.35	2.77	12.58	2.35
ACT	PTE	8.16	8.79	6.29	20.07	2.79
ACT	LI1	4.50	9.13	2.92	20.00	3.33
ACT	LI2	6.88	3.94	3.97	18.33	2.05
ACT	LU1	7.47	19.41	4.04	16.61	2.68
ACT	LU2	7.30	10.74	1.99	13.30	2.75
ACT	TE1	8.29	7.49	6.61	16.96	3.39
ACT	TE2	7.31	5.54	14.18	18.55	2.73

VI. INTERPRETATION OF RESULTS AND CONCLUSIONS

Compound FDA 73-83, Mustard Yellow, was evaluated for genetic activity in a series of *in vitro* microbial assays with and without metabolic activation. The following results were obtained:

A. *Salmonella typhimurium*

1. Plate Tests

At a concentration of 0.5%, this compound was not mutagenic for any of the indicator strains in direct or activation plate tests.

2. Nonactivation suspension tests

The results of these tests were negative.

3. Activation suspension tests

The results of these tests were considered negative. The mutant frequencies for several of the doses with TA-1538 using mouse tissues were slightly increased. The rat and primate data were clearly negative. No reason was apparent for the increases.

B. *Saccharomyces cerevisiae*

1. Nonactivation suspension tests

The results of these tests were negative.

2. Activation suspension tests

The results of these tests were negative. Random apparent increases were noted at a few of the *ade* doses. No pattern was observed indicating that the increases were induced.

C. Conclusions

The test compound, Mustard Yellow, did not exhibit genetic activity in the *in vitro* assays employed in this evaluation.

Submitted by:

David Brusick

David Brusick, Ph.D.
Director of Genetics

APPENDIX

Tabulation of Data

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 505803 DETECTOR TA1535 SPECIES DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	1340	0136	10.15	0
	NAP		EMS 0.002 %	1327	3632	273.70	0
977051390	NA1		0005-1 PCT.	0547	0095	17.37	0
977051390	NA2		0025-2 PCT.	0647	0097	14.99	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 508301 DETECTOR TA1537 SPECIES DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0713	0015	2.10	0
	NAP		QM 1.0 UG/ML	0421	0951	225.89	0
977051390	NA1		0005-1 PCT.	0767	0022	2.87	1
977051390	NA2		0025-2 PCT.	1029	0021	2.04	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 505802 DETECTOR TA1538 SPECIES DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		DMSO	0599	0054	9.02	0
	NAP		NF 125 UG-ML	0546	0797	145.97	0
977051390	NA1		0005-1 PCT.	0229	0036	15.72	0
977051390	NA2		0025-2 PCT.	0386	0045	11.66	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 505804 DETECTOR 0000D4 SPECIES DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	NAN		SALINE	0947	0015	0016	1.58	1.69	0
	NAP		EMS 1.0 %	0702	0795	0422	113.25	60.11	7
977051390	NA1		0005-3 PCT.	0399	0004	0021	1.00	5.26	1
977051390	NA2		0025-4 PCT.	0456	0006	0014	1.32	3.07	1

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 506301 DETECTOR TA1535 SPECIES ICRFLO DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0734	0044	5.99	0
	A+T		***NO MATCH***	0819	0102	12.45	0
	A-C		SALINE	0917	0061	6.65	0
	ACP	LI	DMN 50 UM/ML	0456	5330	1168.86	1
	ACP	LU	DMN 50 UM/ML	0608	0049	8.06	0
	ACP	TE	DMN 50 UM/ML	0590	0055	9.32	0
977051390	ACT	LI1	0005-1 PCT.	0808	0040	4.95	0
977051390	ACT	LI2	0025-2 PCT.	0850	0061	7.18	0
977051390	ACT	LU1	0005-1 PCT.	0951	0062	6.52	2
977051390	ACT	LU2	0025-2 PCT.	0677	0060	8.86	0
977051390	ACT	TE1	0005-1 PCT.	0791	0048	6.07	0
977051390	ACT	TE2	0025-2 PCT.	0815	0075	9.20	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 505901 DETECTOR TA1537 SPECIES ICRFLO DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	1476	0031	2.10	0
	A+T		***NO MATCH***	1524	0032	2.10	0
	A-C		DMSO	1445	0042	2.91	0
	ACP	LI	AAF 800 UG/ML	1489	0150	10.07	0
	ACP	LU	AAF 800 UG/ML	1463	0032	2.19	0
	ACP	TE	AAF 800 UG/ML	1293	0037	2.86	0
977051390	ACT	LI1	0005-1 PCT.	1493	0041	2.75	2
977051390	ACT	LI2	0025-2 PCT.	1546	0035	2.26	2
977051390	ACT	LU1	0005-1 PCT.	1530	0034	2.22	2
977051390	ACT	LU2	0025-2 PCT.	1483	0034	2.29	2
977051390	ACT	TE1	0005-1 PCT.	1485	0063	4.24	0
977051390	ACT	TE2	0025-2 PCT.	1476	0030	2.03	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 506401 DETECTOR TA1538 SPECIES ICRFLO DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0598	0067	11.20	0
	A+T		***NO MATCH***	0841	0088	10.46	0
	A-C		DMSO	0446	0047	10.54	0
	ACP	LI	AAF 800 UG/ML	0505	0189	37.43	0
	ACP	LU	AAF 800 UG/ML	0565	0071	12.57	2
	ACP	TE	AAF 800 UG/ML	0606	0076	12.54	0
977051390	ACT	LI1	0005-1 PCT.	0243	0066	27.16	2
977051390	ACT	LI2	0025-2 PCT.	0335	0084	25.07	0
977051390	ACT	LU1	0005-1 PCT.	0235	0052	22.13	2
977051390	ACT	LU2	0025-2 PCT.	0267	0052	19.48	2
977051390	ACT	TE1	0005-1 PCT.	0213	0062	29.11	0
977051390	ACT	TE2	0025-2 PCT.	0234	0051	21.79	2

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 510401 DETECTOR 0000D4. SPECIES ICRFLO DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0706	0113	0029	16.01	4.11	0
	A+T		***NO MATCH***	1319	0201	0043	15.24	3.26	6
	A-C		SALINE	0660	0131	0022	19.85	3.33	2
	ACP	LI	DMN 90 UM/ML	0325	0067	0016	20.62	4.92	6
	ACP	LU	DMN 90 UM/ML	0870	0340	0028	39.08	3.22	2
	ACP	TE	DMN 90 UM/ML	0850	0200	0028	23.53	3.29	4
977051390	ACT	LI1	0005-3 PCT.	0579	0104	0013	17.96	2.25	0
977051390	ACT	LI2	0025-4 PCT.	0647	0123	0020	19.01	3.09	6
977051390	ACT	LU1	0005-3 PCT.	0391	0064	0007	16.37	1.79	0
977051390	ACT	LU2	0025-4 PCT.	0579	0117	0008	20.21	1.38	0
977051390	ACT	TE1	0005-3 PCT.	0558	0077	0014	13.80	2.51	4
977051390	ACT	TE2	0025-4 PCT.	0729	0113	0021	15.50	2.88	6

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 506501 DETECTOR TA1535 SPECIES SPRDAW DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0435	0076	17.47	0
	A+T		***NO MATCH***	0571	0063	11.03	0
	A-C		SALINE	0697	0081	11.62	0
	ACP	LI	DMN 50 UM/ML	0388	5820	1500.00	0
	ACP	LU	DMN 50 UM/ML	0410	0075	18.29	0
	ACP	TE	DMN 50 UM/ML	0356	0080	22.47	2
977051390	ACT	LI1	0005-1 PCT.	0851	0101	11.87	2
977051390	ACT	LI2	0025-2 PCT.	0708	0078	11.02	2
977051390	ACT	LU1	0005-1 PCT.	0682	0100	14.66	2
977051390	ACT	LU2	0025-2 PCT.	0641	0079	12.32	2
977051390	ACT	TE1	0005-1 PCT.	0622	0099	15.92	2
977051390	ACT	TE2	0025-2 PCT.	0706	0098	13.88	2

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 507001 DETECTOR TA1537 SPECIES SPRDAW DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	1906	0012	0.63	0
	A+T		***NO MATCH***	2198	0027	1.23	0
	A-C		DMSO	1900	0011	0.58	0
	ACP	LI	AAF 800 UG/ML	1594	0116	7.28	0
	ACP	LU	AAF 800 UG/ML	1657	0014	0.84	2
	ACP	TE	AAF 800 UG/ML	1841	0006	0.33	2
977051390	ACT	LI1	0005-1 PCT.	1989	0010	0.50	0
977051390	ACT	LI2	0025-2 PCT.	2219	0013	0.59	0
977051390	ACT	LU1	0005-1 PCT.	2063	0010	0.48	0
977051390	ACT	LU2	0025-2 PCT.	1881	0012	0.64	0
977051390	ACT	TE1	0005-1 PCT.	2084	0013	0.62	0
977051390	ACT	TE2	0025-2 PCT.	1699	0014	0.82	1

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 507901 DETECTOR TA1538 SPECIES SPRDAW DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0445	0024	5.39	0
	A+T		***NO MATCH***	0275	0029	10.55	2
	A-C		DMSO	0392	0021	5.36	0
	ACP	LI	AAF 800 UG/ML	0507	0301	59.37	0
	ACP	LU	AAF 800 UG/ML	0588	0043	7.31	0
	ACP	TE	AAF 800 UG/ML	0541	0044	8.13	0
977051390	ACT	LI1	0005-1 PCT.	0430	0029	6.74	0
977051390	ACT	LI2	0025-2 PCT.	0293	0032	10.92	0
977051390	ACT	LU1	0005-1 PCT.	0435	0025	5.75	0
977051390	ACT	LU2	0025-2 PCT.	0570	0031	5.44	2
977051390	ACT	TE1	0005-1 PCT.	0421	0031	7.36	2
977051390	ACT	TE2	0025-2 PCT.	0522	0035	6.70	0

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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 506601 DETECTOR 0000D4 SPECIES SPRDAW/RAT DATE - 06/24/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	1037	0006	0004	0.58	0.39	4
	A+T		***NO MATCH***	1020	0024	0028	2.35	2.75	4
	A-C		SALINE	1104	0008	0002	0.72	0.18	4
	ACP	LI	DMN 90 UM/ML	0949	0083	0097	8.75	10.22	4
	ACP	LU	DMN 90 UM/ML	0794	0027	0011	3.40	1.39	6
	ACP	TE	DMN 90 UM/ML	1035	0035	0020	3.38	1.93	4
977051390	ACT	LI1	0005-3 PCT.	0814	0012	0026	1.47	3.19	4
977051390	ACT	LI2	0025-4 PCT.	0782	0022	0046	2.81	5.88	4
977051390	ACT	LU1	0005-3 PCT.	0797	0015	0018	1.88	2.26	4
977051390	ACT	LU2	0025-4 PCT.	0798	0009	0010	1.13	1.25	4
977051390	ACT	TE1	0005-3 PCT.	0766	0019	0006	2.48	0.78	4
977051390	ACT	TE2	0025-4 PCT.	0922	0022	0016	2.39	1.74	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 507201 DETECTOR TA1535 SPECIES RHESUS DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0888	0066	7.43	2
	A+T		***NO MATCH***	0541	0076	14.05	0
	A-C		SALINE	0913	0064	7.01	0
	ACP	LI	DMN 50 UM/ML	0502	6791	1352.79	0
	ACP	LU	DMN 50 UM/ML	0823	0038	4.62	0
	ACP	TE	DMN 50 UM/ML	0625	0051	8.16	0
977051390	ACT	LI1	0005-1 PCT.	0666	0030	4.50	0
977051390	ACT	LI2	0025-2 PCT.	0828	0057	6.88	2
977051390	ACT	LU1	0005-1 PCT.	0495	0037	7.47	0
977051390	ACT	LU2	0025-2 PCT.	0671	0049	7.30	2
977051390	ACT	TE1	0005-1 PCT.	0543	0045	8.29	0
977051390	ACT	TE2	0025-2 PCT.	0916	0067	7.31	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 511401 DETECTOR TA1537. SPECIES RHESUS DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0847	0063	7.44	2
	A+T		***NO MATCH***	0515	0061	11.84	0
	A-C		DMSO	0710	0050	7.04	0
	ACP	LI	AAF 800 UG/ML	0844	0163	19.31	0
	ACP	LU	AAF 800 UG/ML	0914	0058	6.35	0
	ACP	TE	AAF 800 UG/ML	0842	0074	8.79	0
977051390	ACT	LI1	0005-3 PCT.	0449	0041	9.13	0
977051390	ACT	LI2	0025-4 PCT.	1421	0056	3.94	0
977051390	ACT	LU1	0005-3 PCT.	0407	0079	19.41	0
977051390	ACT	LU2	0025-4 PCT.	0447	0048	10.74	0
977051390	ACT	TE1	0005-3 PCT.	0574	0043	7.49	0
977051390	ACT	TE2	0025-4 PCT.	0686	0038	5.54	0

REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 507601 DETECTOR TA1538 SPECIES RHESUS DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0802	0036	4.49	0
	A+T		***NO MATCH***	0464	0019	4.09	0
	A-C		DMSO	0721	0040	5.55	0
	ACP	LI	AAF 800 UG/ML	0601	0145	24.13	2
	ACP	LU	AAF 800 UG/ML	0649	0018	2.77	0
	ACP	TE	AAF 800 UG/ML	0572	0036	6.29	0
977051390	ACT	LI1	0005-1 PCT.	0513	0015	2.92	2
977051390	ACT	LI2	0025-2 PCT.	0453	0018	3.97	0
977051390	ACT	LU1	0005-1 PCT.	0421	0017	4.04	0
977051390	ACT	LU2	0025-2 PCT.	0654	0013	1.99	0
977051390	ACT	TE1	0005-1 PCT.	0439	0029	6.61	0
977051390	ACT	TE2	0025-2 PCT.	0395	0056	14.18	0

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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 510501 DETECTOR 0000D4 SPECIES RHESUS DATE - 05/15/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0423	0044	0007	10.40	1.65	0
	A+T		***NO MATCH***	0548	0086	0014	15.69	2.55	0
	A-C		SALINE	0759	0112	0017	14.76	2.24	0
	ACP	LI	DMN 90 UM/ML	0774	0116	0021	14.99	2.71	0
	ACP	LU	DMN 90 UM/ML	0469	0059	0011	12.58	2.35	0
	ACP	TE	DMN 90 UM/ML	0538	0108	0015	20.07	2.79	0
977051390	ACT	LI1	0005-3 PCT.	0570	0114	0019	20.00	3.33	4
977051390	ACT	LI2	0025-4 PCT.	0633	0116	0013	18.33	2.05	0
977051390	ACT	LU1	0005-3 PCT.	0560	0093	0015	16.61	2.68	0
977051390	ACT	LU2	0025-4 PCT.	0436	0058	0012	13.30	2.75	0
977051390	ACT	TE1	0005-3 PCT.	0560	0095	0019	16.96	3.39	0
977051390	ACT	TE2	0025-4 PCT.	0550	0102	0015	18.55	2.73	0